

WHAT IS CLAIMED IS:

1. Seed of a cotton variety designated 01Z34 wherein a sample of seed was deposited under ATCC Accession No. _____.
2. A cotton plant, or parts thereof, of variety 01Z34, seed of said variety having been deposited under ATCC Accession No. _____.
3. Pollen of the plant of claim 2.
4. An ovule of the plant of claim 2.
5. A tissue culture of regenerable cells from the plant of claim 2.
6. A tissue culture according to claim 5, wherein said cell or a protoplast of the tissue culture is derived from a tissue selected from the group consisting of: leaves, pollen, embryos, cotyledon, hypocotyl, meristematic cells, roots, root tips, anthers, flowers, seeds, stems and pods.
7. A cotton plant regenerated from the tissue culture of claim 5, wherein the regenerated plant is capable of expressing all of the morphological and physiological characteristics of cotton cultivar 01Z34 and wherein a sample of seed was deposited under ATCC Accession No. _____.
8. A method for producing a hybrid cotton seed comprising crossing a first parent cotton plant with a second parent cotton plant and harvesting the resultant hybrid cotton seed, wherein said first parent cotton plant or said second parent cotton plant is the cotton plant of claim 2.
9. A hybrid cotton seed produced by the method of claim 8.
10. A hybrid cotton plant, or parts thereof, produced by growing said hybrid cotton seed of claim 9.
11. A method of producing a cotton seed by growing said hybrid cotton plant of claim 10 and harvesting the resultant seed.

12. A method for producing a cotton variety 01Z34-derived cotton plant, comprising:
 - a) crossing cotton variety 01Z34 wherein a sample of seed was deposited under ATCC accession number _____, with a second cotton plant to yield progeny cotton seed; and
 - b) growing said progeny cotton seed, under plant growth conditions, to yield said cotton variety 01Z34-derived cotton plant.
13. A cotton plant, or parts thereof, produced by the method of claim 12.
14. A method for producing a cotton variety 01Z34-derived cotton plant, comprising:
 - a) crossing cotton variety 01Z34 wherein a sample of seed was deposited under ATCC accession number _____, with a second cotton plant to yield progeny cotton seed;
 - b) growing said progeny cotton seed, under plant growth conditions, to yield said cotton variety 01Z34-derived cotton plant;
 - c) crossing said cotton variety 01Z34-derived cotton plant with itself to yield additional cotton variety 01Z34-derived progeny cotton seed;
 - d) growing said progeny cotton seed of step (c) under plant growth conditions, to yield additional cotton variety 01Z34-derived cotton plants; and
 - e) repeating the crossing and growing steps of (c) and (d) from 0 to 7 times to generate further cotton variety 01Z34-derived cotton plants.
15. A cotton plant, or parts thereof, produced by the method of claim 14.
16. The cotton plant, or parts thereof, of claim 2, wherein the plant or parts thereof have been transformed so that its genetic material contains a transgene operably linked to a regulatory element and wherein said transgene is selected from the group consisting of: herbicide resistance, insect resistance and disease resistance.

17. A cotton plant according to claim 16, wherein said herbicide resistance is to glyphosate, glufosinate; a sulfonylurea or imidazolinone herbicide, or a protoporphyrinogen oxidase inhibitor.
18. A method for producing a cotton plant that contains in its genetic material a transgene, comprising crossing the cotton plant of claim 2 with a cotton plant containing a transgene, so that the genetic material of the progeny that result from the cross contains a transgene operably linked to a regulatory element.
19. The method of claim 18, wherein said transgene is selected from the group consisting of: herbicide resistance, insect resistance and disease resistance.
20. Cotton plants, or parts thereof, produced by the method of claim 18.